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ABSTRACT

Over the past 10 years, national conferences and committees investigating the state of American mathematics education have advocated an increased emphasis on problem solving and mathematical modeling situations in the secondary school curriculum. However, little effort has been made to prepare secondary school teachers to use mathematical modeling techniques in their classrooms. The document presents a variety of classroom modeling activities that were developed and classroom tested by the Mathematical Sciences Program of the Pennsylvania State University at Harrisburg at the secondary school level. After an introductory chapter explaining the concept of mathematical modeling and how it differs from problem solving, the bulk of the document is a series of 22 classroom activities, followed by an appendix giving teachers' guides for each of the activities, and an extensive bibliography for related mathematical modeling activities. The 22 activities can be broken up into the following subject levels, together with the concepts and skills involved: (1) General Mathematics--involving Ratio and Proportion, Pythagorean's Formula, the Distance Formula, and Probability; (2) Algebra 1--involving Simple Graphing, Area Computation, Inequalities, Functions and Pattern Recognition, Algebraic Operations, and Simple Programming; (3) Algebra 2--involving Linear Inequalities and Graphing, Circle Equation, Permutations and Counting Techniques, Graphing and Programming Linear Parabolic Equations, Basic Trigonometric Functions, Velocity and Acceleration Formulas, Exponential Functions, and Matrix Arithmetic; and (4) Precalculus--involving Transcendental Functions. (MDH)

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